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The Automobile

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AT THE NEWPORT RACES: W. K. VANDERBILT, JR., IN THE "RED RUSHER."

Automobile Races at Newport.

After a somewhat animated legal battle, the project of the National Automobile Racing Association of Newport, to secure the use of Ocean Drive on Friday afternoon, August 30, for a series of races, was headed off by the opposition of a few determined cottagers. The proposed course makes a circuit nine miles long, and it was intended to police this during the races, which were to be further safeguarded by the signing of a bond for all damages done, by each contestant. The enterprise had the support of a great majority of the cottagers, but the speed proposed was clearly against the law, and the objectors, after the City Council and Board of Aldermen had granted the right to use the road, had no difficulty in obtaining Supreme Court injunctions forbidding racing on the Drive. The races were accordingly transferred to the ½-mile track at Aquidneck Park where they were held last year.

Although there was considerable disappointment over the change, because the smallness and rather poor condition of the track were unfavorable to fast time, still about three thousand people were present, including, of course, all the social lights of Newport.

Just before the races Mr. and Mrs. W. K. Vanderbilt, Jr., entertained one hundred friends at luncheon at Southwick's Grove, after which all adjourned to the Park near by.

All the races except the last two were of three miles or six laps, the sixth race being five miles and the last or championship race being for ten miles. The first was for motocycles, and was won by Kenneth Skinner, with G. M. Holley second. The next race was for electric vehicles, and was won by Allan Blanding in a Wood's carriage.

The third event, for steam carriages, was run in heats. The first was won by J. McMillan Hamilton, and the second by John W. Howard. In the final heat Mr. Howard's racing machine got a half-mile lead and then broke down, when Mr. Howard and his attendant got out and finished by some frantic pushing. They passed under the wire just ahead of Mr. Hamilton, who drove a stock Locomobile; but the judges disqualified them for not finishing according to the rules.

The fourth event was for gasoline vehicles of less than twelve horse-power. In the first heat Fred. Walsh had things his own way with his Gasmobile, a similar machine driven by F. H. Benedict's chauffeur being a bad second, and Hugh L. Willoughby not finishing. The second heat was also a Gasmobile victory, Alexander Fischer driving; while the third was won by Clarence Gray Dinsmore in a Winton. The fourth heat was a walkover for Kenneth Skinner in a De Dion, and the final was won by Mr. Fischer.

The fifth race, for De Dion 5 HP. motorettes, was won by Oliver H. P. Belmont's chauffeur, with W. K. Vanderbilt, Jr., second, and Kenneth Skinner third.

Next to the championship race, the big event of the day was the race for gasoline vehicles of more than twelve horsepower. In this the first heat was contested by Foxhall Keene in his Mors of 28 nominal horse-power and David Wolfe Bishop with his Panhard. It was a rather easy victory for the former, and was followed by an exciting race between W. K. Vanderbilt, Jr., with the "Red Rusher," his 35-HP. Mercedes Daimler, and W. N. Murray, of Pittsburg, in a 40-HP. Winton racer. The latter, though slow at the start, succeeded in holding Mr. Vanderbilt for two and a half miles, after which the Red Rusher gradually widened the gap and finished about 125 yards the winner. In the final Mr. Vanderbilt defeated Mr. Keene by 10 3-5 seconds and bettered his own previous time by seven seconds, showing that he could have administered Mr. Murray a worse beating if he had chosen.

Having defeated Mr. Keene and Mr. Murray, the last race, for the championship in all classes, was easily Mr. Vanderbilt's. His time for the ten miles was 15m. 23⅛s.

The summary follows:

Tricycles and Two-Wheeled Vehicles (first prize, cup offered by Mrs. John R. Drexel).—Won by Kenneth Skinner (De Dion). Second prize, cup offered by Mr. W. K. Vanderbilt, Jr.—Won by G. M. Holley (Holley bicycle). U. G. Scott (bicycle) did not finish. Distance, three miles. Time, 5m. 40s.

Electric Vehicles (first prize, cup offered by Alfred G. Vanderbilt).—Won by Allan Blanding. Lispenard Stewart (Columbia) and Dennison Hatch (Columbia) did not finish. Distance, three miles. Time not taken.

Steam Propelled Vehicles.—First heat—Won by J. McMillan Hamilton (Locomobile); Baron Pierre De Moroques (Locomobile), second; John Jacob Astor (Toledo), third. Paulding Fosdick (Locomobile) did not finish. Distance, three miles. Time, 6m. 25½s. Second heat—Won by John W. Howard (Howard); J. A. Mitchell (Locomobile), second; Henry Howard (Mobile), third; Paul Demming (White), fourth. Distance, three miles. Time, 6m. 20s. Final heat (first prize, cup offered by Mr. John Jacob Astor)—Won by J. McMillan Hamilton. John W. Howard was disqualified.

Gasoline Vehicles Not Developing More Than Twelve Horse-Power.—First heat—Won by F. Walsh (Gasmobile); F. H. Benedict (Gasmobile), second. H. L. Willoughby (Autocar) did not finish. Distance, three miles. Time, 6m. 6¼s. Second heat—Won by Alexander Fischer (Gasmobile); Louis Stern (Panhard), second. George McFadden (Gasmobile), did not finish. Distance, three miles. Time, 6m. 45s. Third heat—Won by C. Gray Dinsmore (Winton) by default. Fourth heat—Won by C. Macey (Gasmobile); James L. Breese (Panhard), second; I. T. Burden, Jr. (Autocar), third. Distance, three miles. Time, 6m. 17¼s. Fifth heat—Won by Kenneth Skinner (De Dion) by default. Final heat (first prize, cup offered by Mrs. Hermann Oelrichs)—Won by Alexander Fischer; second prize, cup offered by the National Automobile Racing Association, won by C. Gray Dinsmore. C. Macey did not finish. Distance, five miles. Time, 9m. 37s.

Special Class for De Dion Five-Horse-Power Voiturettes (first prize, cup offered by W. K. Vanderbilt, Jr.).—Won by Oliver H. P. Belmont; second, cup offered by H. O. Havemeyer, Jr., won by W. K. Vanderbilt, Jr.; Kenneth Skinner, third. Augustus Jay and John R. Livermore did not finish. Distance, three miles. Time, 7m. 35¼s.

Gasoline Vehicles Developing More Than Twelve Horse-Power.—First heat—Won by Foxhall Keene (Mors); David Wolfe Bishop (Panhard), second. Distance, five miles. Time, 8m. 2s. Second heat—Won by W. K. Vanderbilt, Jr. (Daimler); William N. Murray, (Winton), second. Distance, five miles. Time, 7m. 43½s. Final heat (first prize, cup offered by Mrs. W. K. Vanderbilt, Jr.—Won by W. K. Vanderbilt, Jr.; second, cup offered by Mrs. Joseph Widener, won by Foxhall Keene. Distance, five miles. Time, 7m. 36½s.

Championship for Winners in All Classes (first prize, cup offered by Mrs. O. H. P. Belmont)—Won by W. K. Vanderbilt, Jr.; second, cup offered the Locomobile Company of America, won by Kenneth Skinner; Alexander Fischer, third. J. M. Hamilton and O. H. P. Belmont did not finish. Distance, ten miles. Time, 15m. 23½s.

Automobile Sports and Races at Buffalo.

Owing to the difficulties found by the Pan-American Exposition management in fulfilling its part of the agreement regarding the Erie to Buffalo sweepstakes race, namely, to secure the consent of local authorities along the route, the status of this event, and with it that of the week of sports, has been involved in much uncertainty. When on August 15th, after repeated postponements, the management failed to produce these consents, the A. C. A. announced its intention of abandoning the attempt and holding the race elsewhere in October.

Just as this issue goes to press, however, the information comes from the club that, the consents having been at last secured, the race will be held on Friday, Sept. 19, and the week of sports program will also go through, being from the 16th to the 21st, inclusive. This will include the race for the mile record.

Henri Fournier, winner of the Paris-Bordeaux, and Paris-Berlin races, is now in this country and will be a contestant in the longer race at least; and it is expected that such well-known American owners of racing machines as W. K. Vanderbilt, Jr., Albert C. Bostwick, Foxhall Keene, W. N. Murray, Alexander Winton, David Wolfe Bishop, etc., will also enter.

When the abandonment of the "week of sports" was considered settled, the Buffalo Automobile Club threw itself into the breach with a plan for a race meet on the mile track at Fort Erie, just across the river, Sept. 26 to 28, inclusive. The program for this includes events for motor bicycles, tricycles, tandems and quads, steam stock and racing vehicles, electric stock and racing vehicles, gasoline vehicles under and over 1900 lbs., and a mixed class handicap; the prizes to be silver cups, valued at $1,000. At this writing it is impossible to say whether this project will or will not be merged into the "week of sports" at the Stadium.

E. B. Shaw, a brother of Robert Shaw, of Chicago, is the latest Chicagoan to acquire a Panhard auto.

The Columbia Gasoline Runabout.

By Herbert L. Towle.

Although in a broad way the Columbia gasoline runabout may most nearly be compared with French voiturettes of the Darracq and Renault type, yet in its leading details of running gear, speed-changing mechanism, and method of engine control, this machine is unlike any other with which the writer is acquainted, on either side of the water.

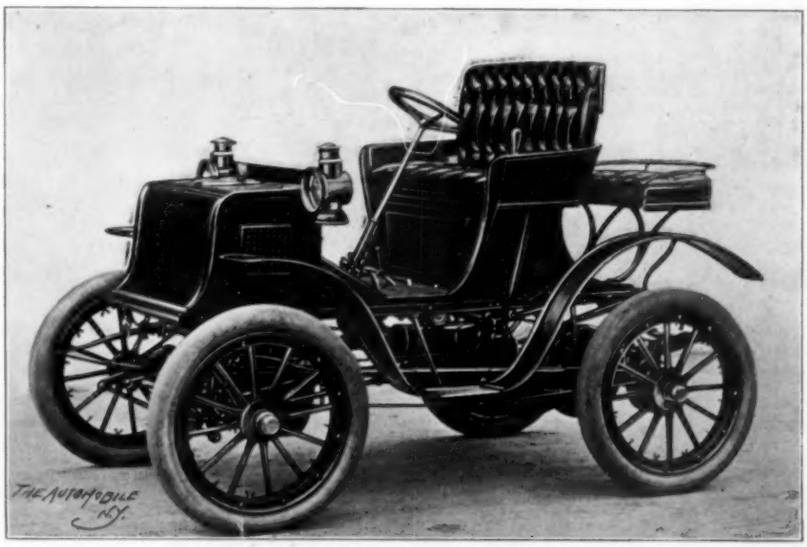


FIG. 1. THE COLUMBIA GASOLINE RUNABOUT.

The vehicle is designed for medium speeds on rough roads, and is moderately engined and substantially built, its total weight with tanks filled and tools on board being somewhat over 1,600 lbs. Its speed on the level is 20 miles an hour, or a little more, and on the low gear it is claimed to take a 25 per cent. grade.

Taking up the running gear first, we find that this is built about the principle of springing the body separately from the machinery. This method has been often tried and usually abandoned, owing to the difficulty of producing an engine that would not be jolted to pieces when the road shocks were transmitted directly to it from the axles, and also because it was found impossible, within practical limits of weight and cost, to produce wheels and tires that would endure the same punishment. In the Columbia machine, however, the larger part at least of these objections is avoided by supporting the front end of the underframe, which carries the engine, on independent springs. This is clearly shown in Fig. 3. The reach tubes A A, Figs. 2 and 3, terminate in forgings between which is pinned the curved member B. At its centre a kingbolt connects the latter to springs C, whose ends are carried by the struts D D of the arched and trussed front axle. The feet E E of the engine crank case afford a rigid connection betwen the reaches, independently of B, and the rear ends of the reaches diverging, are secured to the ball-bearing boxes of the rear axle. In effect, therefore, the underframe is of three-point design with spring-supported front end. Like the ordinary triangular underframe, it gives no backing to the front axle against road shocks suffered by one wheel alone, this duty falling on the elliptic front springs.

From the engine the transmission is through a "wind-up" clutch F (similar in action to the single-acting band brake), through a short shaft G, to the speed-changing gears in the case H. This case is rigidly-connected to the cross tube I, between the reaches, and to the arms J, but as a further precaution against cramping the engine and gear shafts, shaft G connects with the latter by loose squared ends only. A spring K normally tightens the clutch, which is released by a foot pedal.

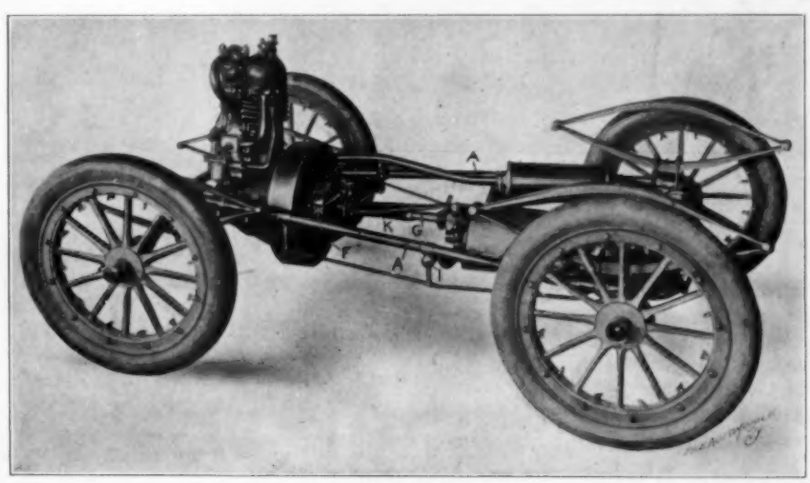


FIG. 2. THE RUNNING GEAR AND MACHINERY.

The speed-changing gears are clearly seen in Fig. 4, the low, middle, and high-speed pairs, and the three giving the reverse, being lettered a, b, c and d, respectively. The pinions on the drive shaft e are keyed fast, while their companion gears, instead of sliding on shaft f, are bushed and turn loosely in constant mesh with the pinions. Connection between them and the shaft is established by the claw clutches g, h, which in the photograph are shown in their neutral position but which slide on squared portions of the shaft to engage lugs cast on the gears. The yokes which shift these clutches are attached to short rock shafts passing through the gear case, and to the outer ends of these are secured the fingers i, j, which work in a slotted slide (not shown). This slide is seen in side elevation at k, Fig. 5, with fingers i and j dotted; from which it will be seen how an up or down movement of the fingers, as the slide is shifted, will throw the yokes and clutches to left or right. The points in the slots giving the fast, middle, slow and reverse speeds are respectively lettered F, M, S and R; and it will easily be seen that a continuous movement of slide k from extreme right (or back) to extreme left will give the several speeds in the above order. A lever under the driver's left hand operates the slide by connection with the lug at its back end.

To prevent changing the gears except when the friction clutch is released, a locking device is provided. This consists of a latch 1 (Fig. 5), drawn down by a spring into notches m m m (for active and neutral positions alternately) in the top of the slide k. A narrow slide, n, is connected to the clutch, releasing which pushes the slide into the position shown in Fig. 5, which lifts the latch and leaves slide k free to move.

At its rear end, shaft f terminates in a bevel pinion, meshing with a bevel gear on the differential, both being encased. The regular brake, acting on the differential, consists of two hinged metal jaws (best seen at L, Fig. 3), which are equally efficient in either direction. They are applied by a separate pedal, the first half of whose movement releases the clutch,

and which has a locking device keeping it down when the driver so wishes. Single-acting emergency brakes act on the rear hubs, and are applied by a pull-up lever under the left hand.

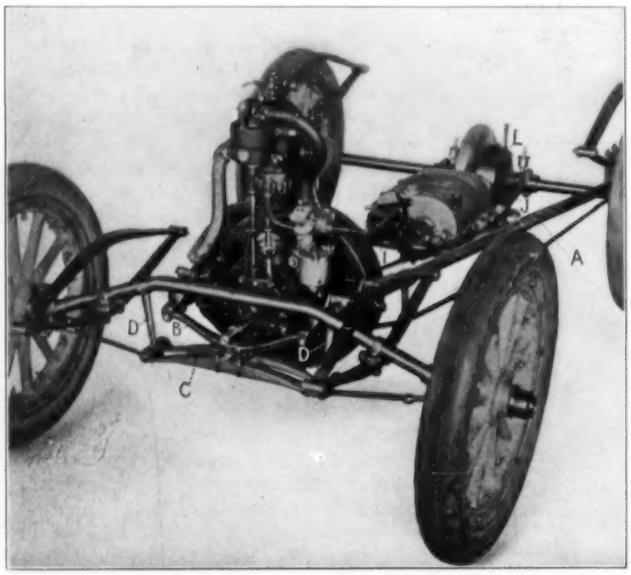


FIG. 3. FRONT OF RUNNING GEAR.

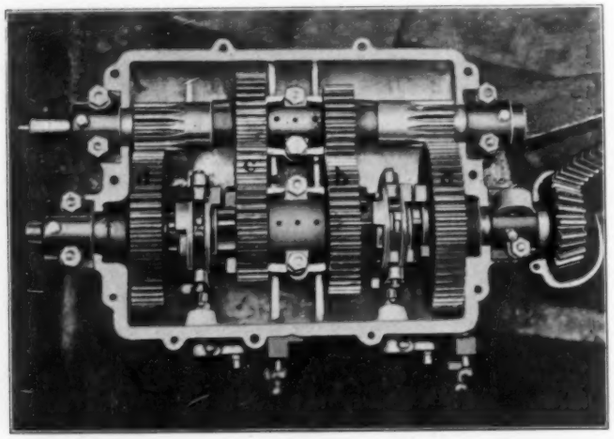


FIG. 4. THE SPEED-CHANGING GEARS.

We may now consider the engine and the method of its control. It has a single cylinder of 4.6-in. bore and 6.8-in. stroke, with a water jacket coming down far enough to cover the piston rings when the latter are at their highest point. The rest of the cylinder is cooled by flanges only. The power is given as 4.5 HP. at 700 turns, corresponding to a vehicle speed of 16 miles per hour; but at its highest speed it will develop between 5 and 6 HP.

The engine is controlled, first, by a centrifugal governor, which progressively advances the spark and throttles the mixture as its speed increases, and, second, by a by-pass throttle or "accelerator" valve, by opening which a full charge of mixture can be admitted at any speed of the engine. The spark control is wholly automatic; the throttle control is also automatic, to prevent "racing" when the load is off, but the charge can be increased at will in spite of the governor's action.

The governor is seen at p, Fig. 6. In rotating it raises the grooved collar just above it, and the collar acts on the lever q, in connection with the contact brushes r of the spark cam, and also on another lever connected with the governor valve in the valve chamber s. This chamber, with both valves, and also the vaporizer to which it is attached, are clearly shown in section in Fig. 7; the vaporizer being brought forward a little to bring it into the plane of the drawing. The vaporizer itself hardly requires explanation, except to say that the arrangement of its upper portion is intended to churn up the mixture by giving it an irregular passage. The governor valve is ordinarily set to keep the engine speed down to about 500 or 600 turns when running light, though the maximum speed with accelerator valve open is much greater, and, of course, the ignition corresponding early. The writer was informed by Mr. H. W. Alden, one of the company's Elizabethport engineers, that at the highest speeds the spark cam makes contact when the piston has moved not over an

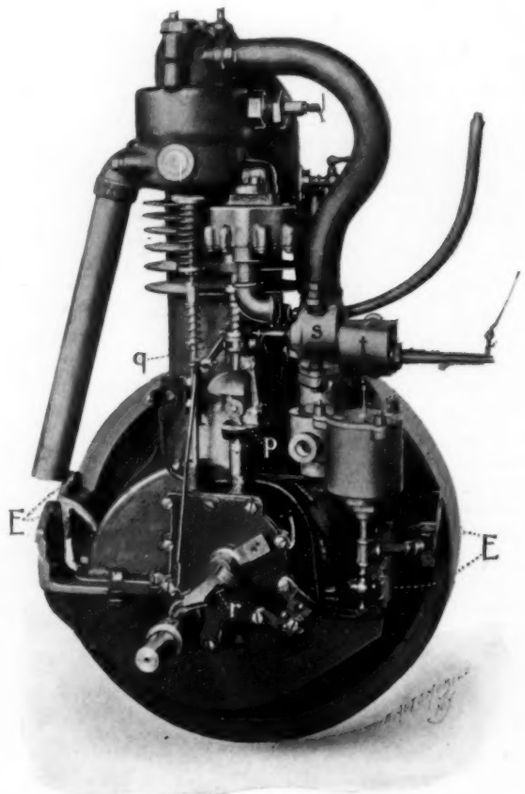


FIG. 6. THE ENGINE.

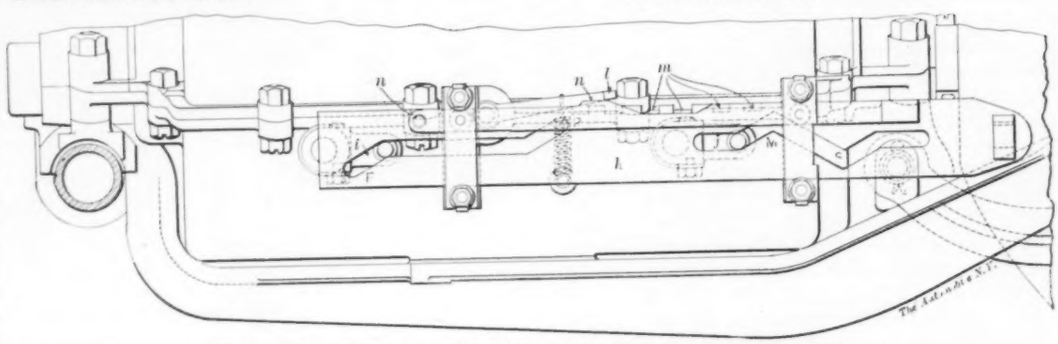


FIG. 5. SIDE ELEVATION OF GEAR CASE, WITH TOP BROKEN OFF.

inch from the beginning of the compression stroke. After making all allowance for the inertia of the vibrator and self-induction of the coil, this is certainly striking proof of the slowness of flame propagation at high speed.

To vary the richness of the mixture a "mixing valve" is provided. This is partially shown in Fig. 7, and consists of a hollow arm or shell, reaching from the valve chamber s (Fig. 6) into the box t.

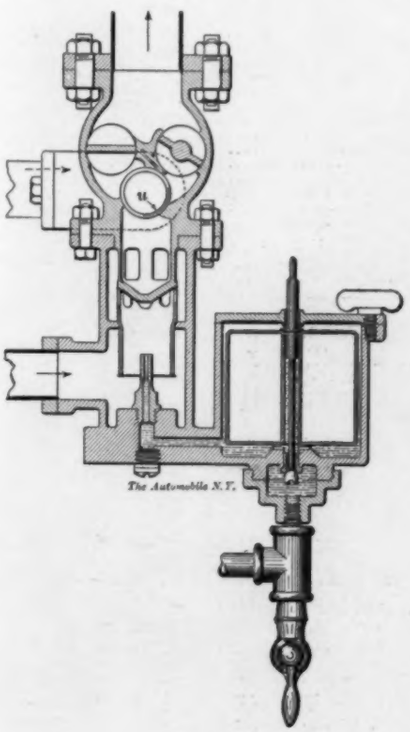


FIG. 7. SECTION OF VAPORIZER.

It has a slot in its side, by which fresh air enters, and inside of it fits a shutter u (Fig. 7), which partially closes or opens the slot and also extends across the valve chamber, partially cutting off the passage of the mixture as it opens the air slot, and vice versa. A foot button adjusts the accelerator, and a hand button the mixing valve.

Steering is by a hand-wheel acting through a steep-pitch screw, and the steering column is hinged so that it can be raised to a vertical position for convenience in mounting. All engine bearings are lubricated from a common tank under the motor bonnet, and the water tank is under the bonnet also. A rotary gear pump at the top of the governor shaft gives forced circulation. The water tank holds six gallons, and the gasoline tank, which is under the seat, holds eleven.

The wheels are 32 inches in diameter, and have 3½-inch Goodrich clincher tires They have standard tread, 56 inches, and a 67½-inch base.

Steam and Gasoline Vehicles Compared.—III.

By Earl P. Mason.

The Gasoline Carriage. (Concluded.)

Upon the engine proper I shall spend but little time, as it is very simple, being almost identical with the trunk or single-acting steam engine. It consists of the usual cylinder, piston, connecting-rod, wrist-pin, crank-pin, cranks, crank-shaft and flywheel. The valve mechanism, however, is somewhat different. The valves of the Otto type of engine are usually worked from a cam shaft, which revolves once for every two revolutions of the engine shaft.

The Day type of engine usually has no valves in the engine proper, though some makers put on an admission valve. This type is usually so arranged that the piston covers and uncovers the ports, and therefore is its own valve. With this type the mixing and compressing of the gas and air takes place first in the lower crank chamber when the piston descends. The latter in its descent first opens an exhaust port situated a little above the bottom of the stroke, through which the expanded gases are ejected by their own pressure. A little further down is the admission port, through which the new supply of gas comes from the crank chamber.

As the intent of this article is more to give a general comparison of steam and gasoline vehicles, the author will not go further into the discussion of the different types of gas engines, but will refer the reader to the many standard works on the gas engine, among which may be mentioned "The Gas and Oil Engine," by D. Clerk, published by John Wiley & Sons, New York.

We now come to the seat of all the worst difficulties with the gasoline engines as they are built to-day; i. e., the ignition and vaporizing or mixing devices.

Ignition of the gases in the cylinders of gas engines is accomplished by several methods, but those most used in automobile work are the hot tube and electrical methods; and of these the electrical method is preferred.

The hot tube has the advantage of simplicity, and with it it is always easy to tell whether your ignition device is working or not, and if not the trouble is easy to locate. It has the disadvantage, however, that the flame that heats the tube is very liable to blow out, in fact it is almost impossible to keep it lighted in a wind.

Electrical ignition may be subdivided into two general classes: 1st, "Jump spark;" 2d, "Contact spark." Either of these may be produced by either primary battery, storage battery or dynamo.

Engineers disagree as to whether the jump spark or contact spark is best, and after having had experience with both, the author has come to the conclusion that "much may be said on both sides," and that the advantages and disadvantages of each about balance.

The jump spark is formed on the secondary circuit of an induction coil, the primary current being interrupted by a vibrator. The contact spark is made by making and breaking the circuit of a primary current inside the cylinder.

In the former more wiring has to be looked after, and it is sometimes difficult to determine whether a failure to work is due to trouble in the primary or the secondary circuit. It has the advantage, however, that there are no working parts inside the cylinder.

The contact spark is very simple, owing to there being but one circuit, and it is very much easier to comprehend and repair if anything gets out of order. It is also easier to set for the proper time of ignition than is the jump spark. The disadvantages of the contact spark are that the working parts, or contact points, are inside of the cylinder and a slight coating of oil or carbon on the points will often cause the ignition mechanism to work badly. With either type the terminals inside the cylinder should be made of platinum or iridium, as hardened steel, which many makers of cheap engines use, will not last and is sure to give considerable trouble.

As to the source of the spark, the writer has tried primary and storage batteries and also small dynamos. The most satisfaction has been derived from ordinary dry bell batteries which cost from ten to twenty-five cents a cell, according to where they are purchased. From four to eight cells are all that is necessary and they will last a long while. When used up new ones can be purchased in nearly every town and city of the country.

A wet battery is not satisfactory on account of the liability of the liquid to slop over. Likewise the storage battery is disadvantageous for the same reason and also because the continual jolting has a tendancy to disintegrate the battery elements.

The dynamo has the advantage that it makes the motor independent of external sources of electricity, but where one is used it is customary to have a battery to start up on and to use in case the dynamo should fail. The author's experience has been that the small magneto dynamos that are used on automobiles are not to be relied upon to any great extent, though at times one may be found that will run without giving any trouble for years.

On a large carriage it would be well to have both batteries and dynamo. For small powers the writer would recommend the dry batteries alone, an extra set of which should always be carried.

We next come to the mixing or carburetting mechanism; that is to say, the device that mixes the air and gasoline to make the explosive mixture that is to be used in the cylinder.

These are of two distinct types, the mixing valve or vaporizer and the carbureter.

The former consists of a valve that introduces a slight amount of liquid gasoline into the air as it goes to the cylinder. By this method all the gasoline is used up. The carbureter consists of a small tank, usually, and the air is allowed to pass either through the gasoline or over its surface thus absorbing the vapor. With this latter method there is left behind a residue of heavier oil that the air will not vaporize.

After using and having had good experience with both the author is slightly prejudiced in favor of the mixing valve on account of its small size, economy and ease of regulation.

Thus we come to the end of the different parts of the carriage.

AT THE PAN-AMERICAN: EXHIBIT OF THE ELECTRIC VEHICLE CO.

The author has endeavored to give an entirely unprejudiced account of the different things to be looked out for in the two types of automobiles in greatest use; i. e., the steam and gasoline carriages; and if these articles are of any aid to the prospective purchaser in showing up the good and bad points of the different types the writer will feel that these few words have not been wasted.

In conclusion it may be stated that, so far as safety goes, the gasoline explosive motor leads, as there is no gas or liquid under pressure, and with electric ignition there is no flame on the carriage.

For ease of detecting and locating anything that may be out of order the steam carriage comes first.

Economy is greatly in favor of the explosive motor.

Comfort of running is in favor of the steam carriage, as the noise and vibration are much less than with the explosion motors constructed at present.

Route of the Endurance Test.

Following is the revised itinerary for the New York to Buffalo endurance test, which starts from the A. C. A. club quarters in New York at 8 A. M. on Sept. 9. The route has been carefully gone over by the committee in charge, consisting of Messrs. W. E. Scarritt, Harlan W. Whipple, and W. M. Power, assisted by a civil engineer, Walter C. Stearns. The latter made a careful survey of the entire course, from which road maps have been made, and recommended several detours from the route originally planned, in order to secure better going.

An important change is the transfer of the hill-climbing contest from Little Falls to Nelson Hill, just beyond Peekskill, on the first day of the contest. This hill is 2,372 feet long between control points, with a maximum grade of 16½ per cent. an average of about 10 per cent.

A late change in the regulations provides that the load for light delivery wagons, Class E, shall be not less than 300 lbs. (instead of 500), exclusive of operators, fuel and water.

FIRST STAGE.

	Miles.	Total miles.
NEW YORK (start)	0.0	0.0
Kingsbridge	12.9	12.9
Yonkers	4.1	17
Hastings	4.5	21.5
Dobbs Ferry	1.5	23
Irvington	1.8	24.8
Tarrytown	2.9	27.7
Scarboro	3.9	31.6
Ossining (Sing Sing)	1.9	33.5
Croton Landing	2.4	35.9
Oscawana	3.5	39.4
Montrose	2	41.4
PEEKSKILL (noon control)	3.2	44.6
Annsville	1.5	46.1
NELSON HILL (hill climbing contect)	1.4	47.5
Garrison	4.4	51.9
Cold Spring	4.1	56
Fishkill Village	8.8	64.8
Glenham	2.3	67.1
Fishkill Landing	1.9	69
Hughsonville	6.5	75.5
Wappinger Falls	1.4	76.9
POUGHKEEPSIE	7.5	84.4

SECOND STAGE.

POUGHKEEPSIE	0.0	84.4
Hyde Park	6.3	90.7
Staatsburg	4.1	94.8
Rhinebeck	6	100.8
Red Hook	5.5	106.3
Upper Red Hook	2.7	109
Nevis	2.7	111.7
Clermont	1.8	113.5
Blue Store	1.8	115.3
Greendale	6.4	121.7
HUDSON (noon control)	4	125.7
Stottville	3.1	128.8
Stockport	2.4	131.2
Stuyvesant Falls	3.5	134.7
Kinderhook	3.5	138.2
Muitzeskill	6.9	145.1
Schodack Landing	2	147.1
Castleton	3.5	150.6
Greenbush	8.2	158.8
ALBANY	1	159.8

THIRD STAGE.

ALBANY	0.0	159.8
Loudonville	4	163.8
Newtonville	1.9	165.7
Niskayuna	5.6	171.3
Schenectady	6.7	178
Scotia	1.4	179.4
Hoffman's Ferry	7.8	187.2
Cranesville	3.4	190.6
Amsterdam	3.3	193.9
Aiken	2.7	196.6
Tribes Hill	2.5	199.1
FONDA (noon control)	5.2	204.3
Yosts	5.8	210.1
Palatine Bridge	5.9	216
Nelliston	2.8	218.8
Palatine Church	2.4	221.2
St. Johnsville	3.5	224.7
Little Falls	10	234.7
HERKIMER	7.3	242

FOURTH STAGE.

HERKIMER.	0.0	242
Mohawk	1.3	243.3
Ilion	1.8	245.1
Frankfort	2.3	247.4
Utica	9.5	256.9
New Hartford	3.7	260.6
Kirkland	5	265.6
Lairdsville	2.6	268.2
Vernon	5.7	273.9
Sherrill	2.7	276.6
Oneida Castle	2.2	278.8
ONEIDA (noon control)	1.5	280.3
Wampsville	3.2	283.5
Quality Hill	3 5	287
Sullivan	3.8	290.8
Chittenango	1	291.8
Mycenae	3 3	295.1
Fayetteville	4.3	299.4
De Witt	3.2	302.6
SYRACUSE.	4.5	307.1

FIFTH STAGE.

SYRACUSE	0.0	307.1
Fairmount	4.6	311.7
Camillus	3.6	315.3
Elbridge	7.3	322.6
Weedsport	7.3	329.9
Port Byron	3	332.9
Montezuma	5.2	338.1
Savannah	4.5	342.6
Clyde	6	348.6
Lock Berlin	4	352.6
LYONS (noon control)	2.5	355.1
Newark	9.5	364.5
East Palmyra	3.8	368.4
Palmyra	3.5	371.9
Macedon	4.5	376.4
Egypt	5.4	381.8
Pittsford	6	387.8
ROCHESTER.	6.5	394.3

SIXTH STAGE.

ROCHESTER	0.0	394.3
Gates	4.4	398.7
North Chili	6.3	405
Churchville	4.1	409.1
Bergen	3.3	412.4
Byron	6.2	418.6
Newkirk	5.1	423.7
BATAVIA (noon control)	4	427.7
West Batavia	6	433.7
Corfu	6	439.7
Crittenden	4	443.7
Mill Grove	3.5	447.2
Wilhelm	4	451.2
Bowmansville	3	454.2
BUFFALO	10	464.2

RECAPITULATION.

New York to Poughkeepsie	84.4
Poughkeepsie to Albany	75.4
Albany to Herkimer	82.2
Herkimer to Syracuse	65.1
Syracuse to Rochester	87.2
Rochester to Buffalo	69.9
Total distance	464.2

Arthur J. Eddy lately traveled from Chicago to Buffalo, 580 miles, in 3½ days. He considers the roads poor as far as Cleveland, but excellent from there to Buffalo.

Fire-tube, Water-tube and Flash Boilers Compared:—I.

By Walter L. Bodman.

The commercial expression, that "a man cannot get something for nothing," has particular application to automobilism, and confronts the would-be chauffeur in making his selection of a system to use at every point.

The poetry of motion is embodied in a steam car to an extent that no other form of developing energy for road transport cars can even measurably approach, whilst compliance with the aesthetic demands of silence and design and the commercial requirements of cheapness and ease of repairs place steam systems away ahead of all others.

The price paid for this is the presence on the car of the boiler, or, as it is more usually called in quick steaming types, the generator, with its cares of water feed and burner control. In the light of our present knowledge of materials of exceptional strength, and of the small areas of the boilers used, there is no necessity to even consider the question of safety, for it is far greater than any conceivable condition can call for, and not improbably involves less risk than the fixing of some types of cylinder heads on explosion engines.

The various generators that offer possibilities for automobiles, whether light or heavy, range under the three heads of (1) fire tube or tubular; (2) water tube or tubulous; (3) flash or superheat generators.

Of the first type it may be said that it is the simplest in construction and operation, and carrying as it does a fair volume of water for its size, it is capable of absorbing enough heat to equalize the speed on hills of any length better than other types. The feed is not so delicate as in a water tube boiler, nor nearly so difficult to read in the gauge glass; in fact, very little care is required to work this generator with absolute certainty if only the makers provide proper mountings, so placed that they can be relied upon to work efficiently. The best known example of this generator to the American is as it is used by the Locomobile Co. In Great Britain it has for many years been used for launch work, both river and channel, and for the last six years by the Lancashire Motor Co. on heavy automobiles.

The chief objections to this type of automobile boiler lie in (a) the difficulty of access to the interior and the little that can be done in examination of the state of the generator; (b) the poor mechanical efficiency of the boiler. Although it is perfectly possible to design hand holes in the shell that will readily open up for examination, the tubes are so closely spaced that practically nothing can be seen or done.

On the other hand, it is really not needful to working conditions to be able to get inside these boilers, for experience with locomotive boilers, which are practically just as inaccessible, has taught us that with very ordinary care neither scale or mud need trouble the boilers at all, nor through that cause should there be any risk of burning out the tubes. If, after every eight or ten hours' use, the boiler is thoroughly blown out, and before filling up, washed through with clear water, and if in addition, when opportunity occurs, the water be pumped high in the glass and two or three inches blown down, no deposit will ever find a footing in the generator.

To induce users to do this, makers of steam automobiles should use great care in placing the blow-out valve in an easily accessible place, and in the writer's opinion it should be a sine qua non of steam carriage design, that the engine be capable of prompt disengagement at any time for warming up, testing and pumping up the boiler, should the water get low.

A serious objection to generators of this type in such small sizes is their poor mechanical efficiency or ability to evaporate per square foot of heating surface. The lowest efficiency that should be recognized as approaching a good standard is three pounds of water evaporated per square foot of heating surface per hour from 212° Fah., but we have never seen a generator on a light steam carriage capable of doing two-thirds of that amount. Crowding in more and more tubes to obtain a bigger evaporation is a perfunctory method that reduces the steam and water spaces, renders the boiler far more liable to prime and surge, and is very costly.

Reduction of heating surface by the use of surfaces of great efficiency is the prime need of the fire tube boiler, meaning to the user a saving of $2.00 per square foot in cost, and, again, in maintenance, and infinitely smoother working on the cars.

The Lancashire Motor Co. obtain a decided improvement in evaporative efficiency by tapering the tubes, making them ¾ in. diameter at one end and 1 in. at the other, benefiting to as great a degree as is possible in a vertical tube from the rule "that the efficiency of a boiler surface varies with the impinging angle of the hot gases."

Almost the only advantage that can be urged in favor of a water tube generator is that the subdivision of the water into small members makes it practically an absolutely safe boiler. It is liable to all the disadvantages of deposit that a tubular boiler is; it is more delicate in feeding, and is liable to deranged circulation. Athough lighter in weight for evaporative efficiency, so far as the generator is concerned, the allowance for casing and lagging if efficiently made reduces this advantage to practically nil. It is, however, a type that will bear forcing almost unlimitedly, and this, with the short time it takes to get under way, may frequently make it a preferable generator in the larger sizes for stage and truck work.

The lightest types of this boiler the writer has seen in regular automobile

AT THE PAN-AMERICAN: EXHIBITS OF THE 20TH CENTURY CO. AND THE AMERICAN STEAM GAUGE AND VALVE CO.

work are the "De Dion" and the "Lifu." The "De Dion" has inner and outer vertical water shells connected with sloping cross tubes. A generator of this type, weighing 480 pounds, will evaporate its own weight per hour, and with very good economy; but the steam is of very poor quality and the feeding requires constant attention.

The manufacture of water tube generators is a skilled job, and is costly; the casing, being sheet-plate work of high quality, is also costly, and it is probable that for equivalent work a water tube generator is costlier, both in the prime cost and in maintenance, than a tubular generator.

Both these types are in nearly every respect the opposite of the flash or superheated steam generator. Dependent, as they are, on the presence of a steady volume of water, and for their proper working upon the maintenance of perfect circulation of the fluid and on the specific heat of the water equalizing the load on the generator, they rely on conditions that do not exist in a flash generator, or which it is requisite to eliminate therefrom.

(Concluded in next issue.)

John W. Gates, the well-known financier, has lately obtained a twelve horse power Panhard, which is at his Chicago home.

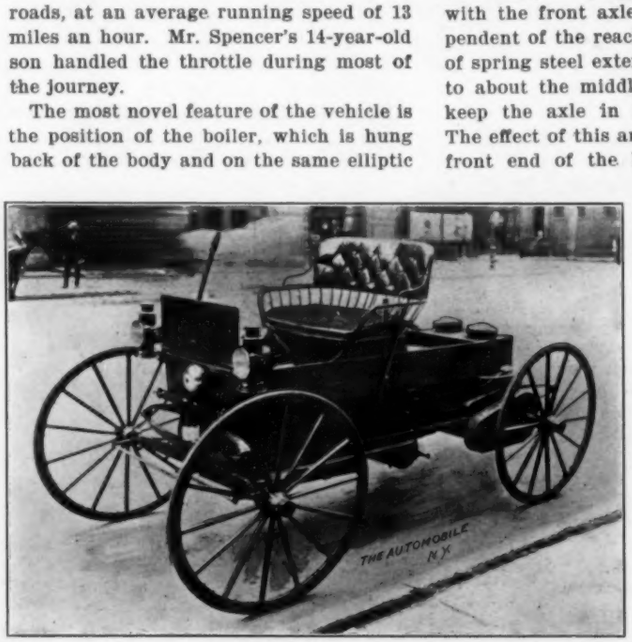
The winner of the "Tour de France," 1899, purchased by Albert C. Bostwick and now the property of Robert J. Collier, was disabled near Narragansett Pier last month by the breaking of one of the sprocket pinions. It was brought to New York to have a new pinion fitted.

Pittsfield, Mass., well known as a summer resort for New Yorkers, has enacted a by-law regulating the speed of automobiles to eight miles an hour within the fire district, and to fifteen miles outside. The penalty for breaking the law is $100 fine or ten days' imprisonment.

A Novel Steam Carriage.

An interesting novelty in the steam carriage line is a vehicle built by Christopher M. Spencer of the Spencer Screw Machine Co., Hartford, Conn. This vehicle, which is shown in the accompanying illustration, was recently driven from Hartford to New York, over fair to poor roads, at an average running speed of 13 miles an hour. Mr. Spencer's 14-year-old son handled the throttle during most of the journey.

The most novel feature of the vehicle is the position of the boiler, which is hung back of the body and on the same elliptic springs which support the latter. To give room for it, the rear axle, which is fixed, is bent forward around the boiler. The engine, which has four single-acting cylinders, is hung beneath the body, thus leaving the latter entirely clear. Valve chests on the cylinder heads, suggestive of the Westinghouse steam engines, distribute the steam, and reversal is effected by shifting the two eccentrics by spiral grooves on the shaft. The Stephenson link motion is not used. From the engine shaft the drive is by chain to a countershaft containing the differential, and thence to the rear wheels by separate chains.



THE SPENCER STEAM CARRIAGE.

The forward portion of the running gear is peculiar. Composite steel and hickory reaches join the rear axle at the back, and their front ends are connected by an arched forging, whose top carries a king bolt on which the front end of the body swivels from side to side. A transverse elliptic spring connects this swivel with the front axle, which is thus independent of the reaches, except that strips of spring steel extend from the axle ends to about the middle of the reaches, and keep the axle in horizontal alignment. The effect of this arrangement is that the front end of the body tends to follow the vertical movements of the front axle, while the rear end follows the rear axle, the resultant twisting being absorbed by the springs.

The boiler is on the water tube principle, and is considered by Mr. Spencer to be proof against damage by failure of the water supply. As evidence of his confidence, the gauge glass is dispensed with, a float regulator being the sole reliance for the feed. The water tank is carried on the reaches under the footboard, where it gets the benefit of the spring support in front, and the gasoline tank is inside the water tank.

The Automobile Club of America has published a complete set of maps covering the route of the New York to Buffalo endurance run, together with a description of the same in detail, including all turns, sign posts, distances and places where water may be obtained.

A 3-ton steam truck has been entered in the Buffalo run by the American Bicycle Co.

NEW STYLES OF AUTOMOBILES

The Toledo Steam Carriage.

This carriage, which was described in these columns last December, has been improved in several particulars since that time, and given also a new body design, which is seen in Fig. 1. The boiler has the same annular water space as before, but the water tubes are now bent into eight nearly flat coils, with the outside ends connecting with the water space and the inner ends bent vertically upward to the top of the boiler, where a horizontal bend joins them into the steam space above the water. The new boiler is said to have 38 sq. ft. of heating surface, and is said to be equally as efficient as the ordinary fire-tube boiler with slightly larger surface. The burner is cast of bronze, and includes a pilot light.

The auxiliary pump, which is worked by an up-and-down motion of the steering tiller, is now arranged so that the down stroke of the tiller is the pumping stroke, instead of the upstroke as before. A heating coil inside the muffler is now provided for the feed water, and the muffler itself is placed in the path of the waste gases from the boiler.

The engine has piston valves instead of the usual slide valves, and Stephenson link motion. A single lever, as described in the article above referred to, controls both speed and reverse.

The body is largely aluminum, the front of it being cast in a single piece from this metal. The total weight of the vehicle with tools aboard and tanks full is over 1,400 lbs., the makers, the American Bicycle Co., believing that there is a special field for a steam carriage of heavy build.

The United States Long Distance Automobile Company's Gasoline Carriage.

The gasoline carriage shown in Fig. 2 is of the single-cylinder type, but is designed for those seeking a lighter machine than the heavy touring phaeton. It weighs about 1,000 lbs. with tanks filled, and has an engine rated at 7 HP. The latter is of 5 by 7 inches cylinder dimensions, and a planetary speed-changing gear gives two forward speeds and one reverse. On the high-speed the gears are regulated by a throttle, on which also a governor acts to prevent racing of the engine.

The circulation is effected by a centrifugal pump, and radiating coils under the footboard keep the water cool. The tank holds 3 gallons, and the gasoline tank 5½. The frame is of angle iron and carries all the machinery on for three-quarters elliptic springs. No reaches are used.

The U. S. Long Distance Automobile Co., Jersey City, N. J., is the maker, under patents granted to C. C. Riotte.

back of the seat. A pilot light permits the main burner to be extinguished without loss of steam pressure.

The Stringer Steam Carriage.

A steam carriage with several noticeable features is illustrated in Fig. 4. The engine has four single-acting cylinders, with the working parts enclosed in a dust-proof case, and it is carried in the extreme rear of the body directly over the rear axle, being connected thereto by a patent chainless transmission. The

FIG. 1. THE TOLEDO STEAM CARRIAGE.

FIG. 2. THE U. S. LONG DISTANCE GASOLINE CARRIAGE.

FIG. 3. THE GROUT STEAM DELIVERY WAGON.

FIG. 4. THE STRINGER STEAM CARRIAGE.

locked and the drive is direct from the sprocket pinion to the rear axle. One lever, mounted on the steering post, controls the forward speeds, and a pedal operates the reverse. Another pedal applies the brakes, one of which acts on each half of the rear axle.

A make and break spark is used, with its lead controlled by hand. Speed is also

The Grout Delivery Wagon.

In Fig. 3 is illustrated a new delivery wagon, built by Grout Brothers, Orange, Mass. The mechanical equipment is the same as in the surrey and dos-a-dos built by the same company, and the wagon is designed for light and quick service. The carrying space of the body is 3 feet wide, 3½ feet high and 3 feet deep from the boiler is just forward of the engine, and is 16 by 16 inches, with 400 ½-inch tubes and seamless steel shell. The water tank is under the seat. The brake is double-acting and the brake pedal is provided with a locking device. The wheels are 32 inches, with 2½-inch tires. The Stringer Automobile Co., of Marion, Ohio, manufactures these carriages.

The Automobile

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CONTENTS.

The Battle-Ground Shifted to Tennessee.

Evidently the old-fashioned notion that the roads belong to the public does not obtain in Tennessee. Mr. Grant Courtright, of 36 S. High St., Columbia, Tenn., has been sued for damages done by a hitched horse which took fright at Mr. Courtright's steam carriage. Mr. Courtright writes that he was coasting by the horse at a very slow speed, but in spite of all his caution the horse broke loose and wrecked the buggy. Now the owner of the animal wants Mr. Courtright to foot the bill, and other horse owners in the same town are threatening injunction proceedings.

In more enlightened parts of the country the principle has been well established that, as the automobile only exceptionally frightens horses and the latter soon becomes accustomed to it, it cannot be treated as a nuisance and therefore cannot be excluded from the public highways except by enactment of the state legislatures. At most, municipalities have the right to regulate its speed and other conditions of use, in the interests of the public at large, and *per se* it has as much right on the highway as any other mode of locomotion, new or old. It will be interesting to note whether, in the face of the enormously growing use of motor vehicles elsewhere, the courts of Tennessee will have the hardihood to declare them a nuisance there.

Meanwhile, as there will no doubt soon be an effort to pass a state law on the subject, it is not too early for Tennessee automobilists to get together for mutual defence. As the decision in Mr. Courtright's case will doubtless carry considerable weight, it would not be a bad plan to combine and make a test case of it.

On European Transmission Gears.

On another page of this issue is given in abstract a discussion of three well-known European systems of transmission, by a well-known English engineer. Although American systems are not touched on, yet the visible tendency of builders in this country to seek lightness and speed along lines that have been found successful abroad renders the article of much interest to readers on this side as well.

As the Panhard system of transmission, with the motor in front and a longitudinal shaft to the speed-changing mechanism under the body, is generally admitted to represent the highest type of gasoline vehicle construction abroad, Mr. Austin's criticism of this system is especially interesting. To us it seems as if his point, in regard to the need of rigidity to preserve shaft alignment, were somewhat strained. The most common and obvious deformation of the main frame—an end-to-end twist such as the lifting of one wheel would occasion—can have little or no effect on this alignment, because the longitudinal shaft is in the neutral axis of the frame, or departs therefrom only by being placed a little lower than the frame itself. A sidewise racking of the frame, such as might possibly occur in turning corners, would either cramp the shaft or affect the theoretical mesh of the bevel pinions; but this could hardly attain any proportions of consequence.

What Mr. Austin says regarding the necessity of putting a good weight on the front wheels, if the vehicle is to be powerfully engined, voices a well-recognized truth. When the rear wheels are the drivers, the propelling force tends to lift the front wheels off the ground, and with a lightly-loaded front end this may and does actually occur if the power is too abruptly applied. Even if contact is not lost, the adhesion becomes so uncertain as to invite skidding and other antics on slight provocation.

In this country, the tendency of the leading builders appears to be towards a nearly equal distribution of weight on front and rear wheels, and, while this may seem radical, experience seems to justify it.

Automobile Highways from the Practical Standpoint.

The suggestion of Mr. George F. Chamberlin, quoted in another column, that the highway problem be solved for automobiles by the construction of special roads, is certainly interesting. Moreover, it appears much more logical than the present costly effort, not simply to produce smooth road surfaces, but to keep them smooth under the destructive impact of horses' feet. The latter, indeed, is strongly suggestive of the struggle between the makers of guns and armor-plate; and in each case the battle has gone perceptibly against the surface attacked.

It needs no argument to show that the requirements of horse and motor vehicles in the matter of roadbed are totally dissimilar, or that those of the latter are far more cheaply satisfied, in spite of the greater smoothness, longer curves, etc., demanded by high speed. Even if the automobile highways were to cost as much as macadam, their maintenance cost would be almost nil, the chief item probably being for constabulary to keep horse drivers off from them. The main practical problem would doubtless be as to ways and means of financing the roads, since their cost would probably come, directly or indirectly, out of the general highway expenditures. Whether the farmers would be willing to see part of the latter diverted to automobile uses for the privilege of being rid of automobile encounters on the main-travelled roads, is a question worth debating. Not impossibly, by the

time separate roads could become a reality, the farmer would have reached the point of regarding the "devil wagon" with equanimity; and if this should unfortunately be the case, there would be nothing for it but for automobilists to build their roads themselves, by subscription or special tax.

Perhaps, however, by that time the distinction will have resolved itself into one between pleasure automobiles and commercial automobiles, each with their own roads; and the horse will intrude not at all. For such a consummation let us devoutly hope.

Road Rules in the City.

It is more important for many reasons to the automobilist than to the horsemen that he observe the rules of the road. This is usually done in the city; but there is possibly one point regarding which greater forethought might be shown. This is in driving up to the curb on the left-hand side of the road. The natural way to do this, of course, is to pull over directly without turning around, which brings the vehicle into conflict with the traffic on that side. But the right way is to do as carriage drivers do before a theatre; that is, to continue down the street on the right side past the point of destination, and then swing around into the traffic on the other side of the road. Aside from the matter of a little more or less "cussing," the automobilist will always do well to remember the fragility of his machine when nipped corner-wise between two wagons, or when otherwise subjected to stresses in other directions than those occasioned on the road. We have seen the running gear of a 2,000-pound machine, one of the staunchest built in this country, crumbled like paper in just this manner, through the error of an inch or two in steering between two trucks.

Kicking the Wrong Dog.

What seems rather like a gratuitous display of fussiness is the objection raised by the automobilists of Washington, D. C., to the proposed police regulation reuiring private motor carriages to carry lights at night. No one who has sense will deny that a vehicle carrying a moderate light is safer in the city than one unlighted; and the only objection should be against the imposition of the requirement on one class of vehicles alone.

More About Steering Systems.

The interesting letter of Mr. Duryea, published in another column, presents what is unquestionably a prolific source of wabbling on the road. Certainly no such lost motion as will permit a four-inch movement of the steering lever at a two-foot radius can be defended; and any considerable amount of lost motion with the wheel steering is undesirable also, although a given angular motion of the wheel, due to loose connections, is of much less consequence than the same angular movement of the lever, owing to the reduction of motion between the steering wheel and the axles.

But although lost motion in the steering gear necessitates constant attention to the direction, it should not be supposed that tight connections will of themselves insure straight driving when a lever is used. So long as the driver must with his own hands keep the vehicle on its course, as if he were steering a sailboat, lack of attention will result in wabbling just as surely as loose connections. We lately heard of a man driving a tiller steered machine, who, stooping down for a moment to adjust a foot button, looked up again to see his mount bucking down a fence and burying itself in a plowed ditch beyond. It was, of course, an extreme case, but it illustrates the point. The machine described by Mr. Duryea has inclined steering pivots by which road shocks are mostly absorbed in the frame instead of being transmitted to the handle, but most machines do not have this feature, which is patented, and it is impossible to argue from one to the other.

As the whole subject is an important one to manufacturers and users both, we shall be pleased to publish further expressions of opinion regarding it from our readers.

A Field for Motor Stages.

The New York Tri-Weekly Tribune recently published an interesting letter from John Bethell Uhle, president of the Highway Alliance, pointing out that a considerable field exists for the public auto stage in districts too thinly settled to make a trolley line profitable. Mr. Uhle thinks that if the trolley road can afford to construct a permanent way and pave the street as well, in return for its franchise, the motor stage company could afford to lay down or at least maintain an improved road over its route.

THE AUTOMOBILE would be glad to receive copies of local or county ordinances relating to automobiles, from all parts of the country, and also authentic particulars in any cases of arrests and prosecutions or automobilists, regardless of whether the plaintiff or defendant appears to have been at fault.

The placing of signs by the Automobile Club of America, throughout Westchester County, N. Y., has been the means of stirring local authorities to action, and steps are being taken to put up sign boards as required by law. The club would be doing good work even if it were only to see that the present laws are enforced in regard to putting up signs.

A Good Roads Congress Called.

The National Good Roads Association of the United States has issued a call for an international good roads congress, to be held in Buffalo, N. Y., from September 16 to 21. It is intended to devote a portion of the time to demonstrations of scientific road construction, including dirt roads, oil, gravel, stone, brick, etc.; and for this purpose a train equipped with modern road-making machinery will be on exhibition, with practical road builders in charge. The deliberations of the congress will include discussions of the most modern methods of road-making, together with reports from different countries. Addresses will be made by prominent men and road engineers, and this, the first international gathering of its sort ever held, will no doubt do much to attract public notice to the possibilities now at hand in the direction of improved roads.

"Steel Road" Interview a Fake.

An alleged interview, published a few weeks ago in one of the New York yellow journals, and since widely circulated, credits Mr. Geo. F. Chamberlin, late acting president of the A. C. A., with the statement that there is a movement on foot to construct a steel road bed on Long Island for the use of automobilists. Mr. Chamberlin has informed THE AUTOMOBILE that the "interview" was a fake pure and simple, and that he never made any statement that could be construed that way.

Mr. Chamberlin, while an advocate of good roads, believes that special roads will be built from which horses will be excluded. Experiments, he says, show that suitable roads could be built of gravel, tar and sand, at a cost not above $1,500 per mile; and such roads, though they would soon be spoiled by horse traffic, would last indefinitely under pneumatic tires alone.

Madison Square Garden Show.

A notable change in the arrangements of the Madison Square Garden Show this fall, from the arrangements of last year's show, will be the omission of the track which was a popular feature last November. The managers think that the space thus occupied can better be devoted to exhibits, and accordingly the exhibitors will make their own arrangements for demonstration runs outside the building. Whether or not this is a move for the better will be best shown by experience. It has been much criticised as detracting from the animation of the show, and quite possibly the box office receipts will be smaller by reason of it. On the other hand, intending purchasers ought to be better satisfied with a street test than with one indoors, and the greater satisfaction of exhibitors and purchasers in this regard may offset the less attendance.

Some European Transmission Gears.

A very suggestive comparison of the principal European forms of transmission gear was made in a paper read by Herbert Austin before the last meeting of the Cycle Engineers' Institute, London. On account of the pressure on our space, publication of the following abstract has been twice postponed, but our readers will find it none the less helpful:

Although the motor has generally been considered the most important part of an automobile, the method of transmission, by which the power may be saved or wasted, is almost equally so. To consider the relative merits and demerits of the several systems, they may be classed under the following heads:

(1) Efficiency, or economy in consumption of power between the motor and the wheels. The lower the efficiency, the larger and heavier must the motor and all parts be made. A perfect system should consume the very least amount of power possible, in order that the weight may be placed where it will lend strength to the vital parts.

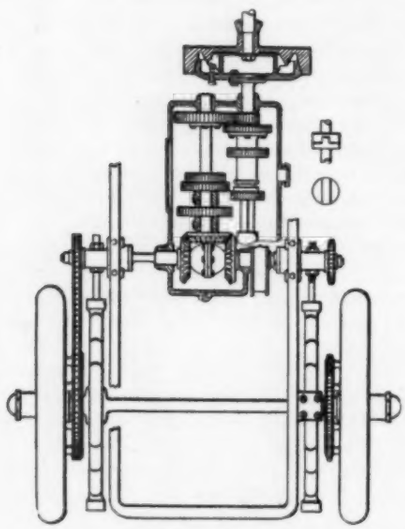


FIG. 1. THE PANHARD SYSTEM.

[The gear case is shown twisted into the horizontal plane for greater clearness.]

(2) Adaptability, or non-interference with comfort, design of the body, accessibility for repairs, etc.

(3) Simplicity. Mechanical complexity is usually costly, but a mechanism may be too simple for its work, e. g., a direct gear drive is impossible with gasoline vehicles, although it is the acme of simplicity.

(4) Lightness: a *sine qua non* up to a certain point, where increased lightness begins to add to the expense.

(5) Durability, a point of growing importance. Chiefly determined by the action of the speed-changing mechanism.

(6) Manipulation: ease of operation and general handiness.

(7) Cheapness, in sense of first cost. Often the lowest factor in the ultimate cost.

The Panhard System.

Vertical engine in front, friction clutch to engine, sliding change speed gears on longitudinal shaft, bevel gears to transverse countershaft containing the differential, and chains to both rear wheels. The Daimler, Mors, Napier and Canello-Durkopp cars come in this class.

Efficiency.—Lightness being an object, the system should not depend too much on the rigidity of the frame. The Panhard system is deficient here, as it requires exact alignment of the several gear shafts. Claw couplings are interposed between the ends and middle portion of the countershaft, but it is doubtful if much is gained thereby. The bevel gears are necessary, but it would be better if they could be avoided. The system of speed changing by dashing one gear into another, though certainly barbarous to look at, is the most efficient once the gears are in mesh. The independent chain drive to the rear wheels, permitting the use of a very light rear axle, is excellent.

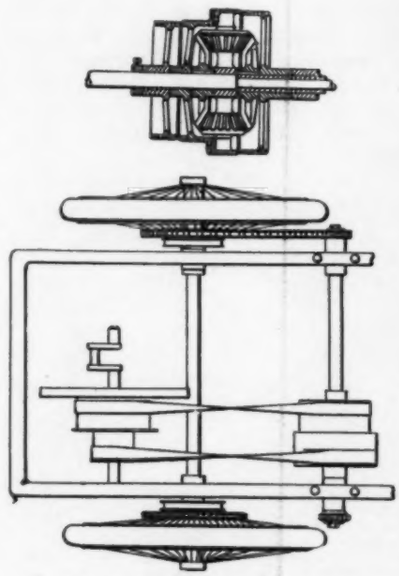


FIG. 2. THE BENZ SYSTEM.

Adaptability.—Here the Panhard system is good. The motor is accessible, and any style of body may be fitted so long as the footboards are loose to get at the gear. The weight is well distributed, the passengers sit well back from the motor, and the car rides well at high speeds.

Simplicity.—Not simple, but with a large range of speeds. Chief complication is in the bevel gear drive and three-piece countershaft.

Lightness.—The frame has to be rather heavy to secure the needed rigidity.

Durability.—Largely governed by efficiency, as undue friction means undue wear. On account of the inertia of the gears revolving at different speeds, it is sometimes different to force them quickly into mesh. They wear quickly and need to be frequently replaced. As the chains cannot be cased, they gather dirt and wear out more rapidly than if they were not so close to the wheels.

Manipulation.—Some dexterity is required to shift the gears without letting them grind. On the other hand, the clutch and brake, operated by a single pedal, are very convenient when handling the car in traffic.

Cheapness.—Expensive in first cost, on account of the accurate work required on the gears to secure alignment and prevent noise, etc.

The Benz System.

Horizontal engine at back of car, belts with fast and loose pulleys, or differential countershaft and chains to both rear wheels. Similar cars are the Star, International (English), Marshall, etc.

Efficiency.—A belt is less efficient than gears, especially when it slips, but this should be considered in connection with the flexibility and cheapness which are its most marked advantages. Most belt pulleys are too small and too wide for the best results.

Adaptability.—Not handy to fit a body to, and nothing but the dog-cart or dos-a-dos style can be used. Car has horseless look, and cannot be fitted with a very powerful motor, on account of there being so little weight in front to keep the front wheels on the ground against the lifting action of the motor.

Simplicity.—This the leading feature of the Benz, and is usually accentuated by the omissions of reversing gear. As high speeds are not permissible, two belts are enough, and further variations are usually obtained by allowing the belts to slip. As all shafts are parallel no right angle drives, etc., are needed.

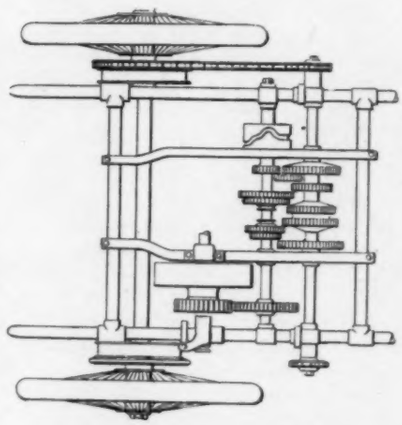


FIG. 3. THE PEUGEOT SYSTEM.

Lightness.—A car on these lines may be very light, as rigidity is not at all necessary; and the belt, being flexible, absorbs the engine impulses and shocks the road, so that the shafts and pulleys may be very light.

Durability.—Beyond the belts and chains, there is very little to wear out.

Manipulation.—This is very simple, and

repairs can be made by unskilled labor. The belts cannot be shifted as instantaneously as a clutch.

Cheapness.—This system is evidently about as cheap to build as anything could possibly be.

The Peugeot System.

Horizontal engine at back, friction clutch, spur gears to shaft carrying sliding gears which engage gears on differential shaft, and chains to both rear wheels.

Efficiency.—Quite similar to Panhard, but shafts more easily kept in line. Objectionable bevel gear drive dispensed with as also the joints in the countershaft. As there is no elasticity in this transmission, it is liable to suffer from road shocks and usage.

Adaptability.—Similar to Benz, but engine is a little further forward. The gears are liable to be noisy, and cannot readily be cased in.

Simplicity.—Preferable to the Panhard, for reasons above noted.

Lightness.—Slightly lighter than the Panhard, but still heavy.

Durability.—Little to choose between this and Panhard.

Manipulation.—A trifle simpler to manipulate. The internal parts of the motor are very inaccessible.

Cheapness.—As all the bearings are in a self-contained case, manufacture in duplicate, and erection, should not be costly.

(Concluded in next issue.)

"Mobile" Stages in New York.

The question whether or not passenger vehicles can be run over a regular route in New York City without a franchise is soon to be settled by the Corporation Counsel. Mr. John Brisben Walker, after a small legal flurry with Deputy City Marshal Brown and the Bureau of Licenses, has started a line of "Suburban Rapid Transit" Mobiles over a route between the Cortlandt street and Wall street ferries by way of Hanover Square. Mr. Walker has paid hack license fees of $5.00 for vehicles, and also special coach licenses to the same amount, these being charged on carriages for hire seating more than two persons inside. Mr. Walker says that these give the carriages the privilege of running anywhere in the city; but Mr. Brown says that Mr. Walker is operating a stage line, and the charter requires that the consent of the property owners, the Mayor and Municipal Assembly must be obtained for a stage line, and the franchise must be sold at public auction.

The vehicles under dispute have a capacity of nine passengers, and are designed essentially on the same lines as the regular carriage. The engine has cylinders 3⅛ by 4 inches cylinder dimensions, and 19½ and 52 gallons of gasoline and water, respectively, are carried. The wheel tread is standard, 56 inches, and the wheel base is 78 inches. They are being operated on short schedule for a ten-cent fare.

CLUB NEWS AND VIEWS

Club Directory.

Automobile Club of America, S. M. Butler, Acting Secy., 753 Fifth Ave., New York City.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Automobile Club of Bridgeport, F. W. Bolande, Secy., 49 Cannon St., Bridgeport, Conn.

Automobile Club of Brooklyn, C. Benton Dix, Secy., Hotel Clarendon, Brooklyn, N. Y.

Automobile Club of California, R. R l'Hommedieu, Secy., San Francisco, Cal.

Automobile Club of Cincinnati, R. H. Cox, Secy., Cincinnati, O.

Automobile Club of Columbus, C. M Chittenden, Sec., Broad St., Columbus, O

Automobile Club of Maine, Henry M. Jones, Secy., Portland, Me.

Automobile Club of New England, Geo. E. McQueston, Secy., Brookline, Mass.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Automobile Club of Syracuse, Frederick N. Elliott, Secy., 515 S. A. & K. Building, Syracuse, N. Y.

Bloomsburg Automobile Club, C. W. Funston, Secy., Bloomsburg, Pa.

Buffalo Automobile Club, Ellicott Evans, Secy., Lenox Hotel, Buffalo, N. Y.

Chicago Automobile Club, H. M. Brinckerhoff, Secy., Monadnock Block, Chicago.

Cleveland Automobile Club, Windsor T. White, Secy., Cleveland, O.

Columbia College Automobile Club, Lewis Iselin, Secy., Col. College, New York.

Dayton Automobile Club, E. Frank Platt, Secy., Dayton, O.

Herkimer Automobile Club, W. I. Taber, Cor. Secy., Herkimer, N. Y.

Hudson County Automobile Club, F. Eveland, Secy., Jersey City, N. J.

Indiana Automobile Club, August Habich, Secy., Indianapolis.

Long Island Automobile Club, C. W. Spurr, Jr., Secy., 1190 Fulton St., Brooklyn, N. Y.

Massachusetts Automobile Club, L. E. Knott, Secy., Ashburton Pl., Boston.

New Bedford Automobile Club, E. G. Watson, Secy., New Bedford, Mass.

New Jersey Automobile Club, Dr. H. Power, Secy., Upper Montclair, N. J.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C. Lewin, Secy., Hotel Flanders, Phila., Pa.

Pennsylvania Automobile Club, H. J. Johnson, Secy., 138 N. Broad St., Philadelphia.

Rhode Island Automobile Club, F. A. Fletcher, Secy., 42 So. Water St., Providence.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

St. Louis Automobile Club, John Ring, Secy., St. Louis, Mo.

Troy Automobile Club, J. S. Thiell, Secy., Troy, N. Y.

Worcester Automobile Club, H. E. Sheiland, Secy., Worcester, Mass.

Chicago Automobile Club.

Mr. Arthur J. Eddy has resigned from the presidency of the Chicago Automobile Club. The direct cause of this step was the unauthorized publication of a report that the club was dissatisfied with Mr. Eddy's way of filling the position, it being said that he never entered the club runs and was but rarely seen at club meetings. As Mr. Eddy is a very busy man, the report was doubtless correct, although the club sentiments on the subject may have been exaggerated. Mr. Eddy, in fact, is quoted as frankly disapproving of the club runs, likening them to a circus parade more than a pleasure outing. Mr. Eddy's successor is Mr. Donald, late first vice-president.

It is reported that the club will soon leave its present quarters on the fourth floor of Steinway Hall and establish itself in a more suitable and commodious location. Several sites for the latter are understood to be under consideration.

Speed Laws in Rhode Island.

In view of the increasing number of conflicting local speed ordinances in Rhode Island, the Rhode Island Automobile Club is advocating a uniform state law restricting the speed of automobiles in the cities and towns to eight miles an hour and in the country to fifteen miles. An enactment covering the above, and having also a clause providing that any bicycle or horse driver may signal automobilists to stop, will be presented by the club at the next meeting of the Legislature.

The only speed law on the books provides for a fine of not less than five dollars and not more than twenty dollars for riding or driving faster than "a common traveling pace" in any city or town of the state, or on any road leading from Pawtuxet to the compact part of Providence.

Automobile Club of Syracuse.

The Automobile Club of Syracuse, N. Y., has been organized, with the following officers: President, T. D. Wilkin; vice-president, Dr. Gregory Doyle; secretary and treasurer, Frederick N. Elliott.

The following officers have been elected by the National Automobile Racing Association of Newport, for the coming year: President, W. K. Vanderbilt, Jr.; Vice-Presidents, Spencer C. Crane and J. M. Hamilton; Secretary and Treasurer, Edward G. Hayward.

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

Extinguishers for Gasoline Fires.

Editor THE AUTOMOBILE:

It occurred to me that you might be interested in knowing something that will effectively extinguish a gasoline fire. The tank of my vehicle is immediately under the front seat, the tool box below that. I spilled a quart or more of gasoline while filling the tank, which filled the tool box, collected there and saturated a large quantity of cotton waste. I accidentally fired this a few moments later and immediately had a large blaze on my hands. The contents of a hand grenade thrown on it sunk below the gasoline and had no effect whatever on the fire. Water was equally useless. But a couple of dashes of spray from a Babcock fire extinguisher put the blaze out instantly, even the woodwork above the tank, which the water did not reach, going out with the rest, due to the carbonic acid gas produced by the extinguisher. It was so instantaneously effective that I thought you might like to know about it, and perhaps the information might help some other automobilist out of trouble.

H. S. Chapin.

New York, August 5.

Lost Motion and the "Wabble."

Editor THE AUTOMOBILE:

The letter of Mr. Uhle on straight driving, as well as your own remarks, have been read by the writer, and some further words on the subject seem desirable. It is a fact that many machines cannot be kept straight in the road, and this fact applies to nearly all steerings and renders the handling of many motor vehicles at speed more or less dangerous. There are several reasons for this wabbling not mentioned by Mr. Uhle, and ignorance of these reasons may lead someone into the wrong decision. One of these causes is loose steering connections. Another is faulty road surface coupled with improper wheel arrangement. A third is improper rake.

In the matter of steering connections, the writer has tested many machines and found tiller steerings permitting a movement of the hand as much as 4 inches at the end of a two-foot lever before the wheels responded, and a 2-inch lost motion on such a lever is very common. It is manifestly impossible to hold a carriage straight in the road with this much lost motion. With wheel steerings a wheel of say 20 inches diameter can often be turned an angular distance at its periphery of one to two inches, indicating an amount of lost motion as much as in the tiller steering; while some wheel steerings have been examined wherein the movement was fully a fifth of a revolution; likewise very poor as a steering device. Knowing these facts we have designed a steering using tensile connections only, which are adjustable so that a visible movement of the steering lever produces a movement of the wheel, and in this way any effort on the part of the operator is communicated to the wheels and the steering becomes positive and certain. The effect of proper wheel base on the steering becomes manifest on rough, rutty, sandy, muddy or slippery roads, and this effect becomes quite apparent if one will examine the tracks left behind when traversing such roads. A short wheel base vehicle cannot make so straight a track as a long one, and a vehicle which tracks with the ruts must either be kept in the ruts or it will tend to slew into the ruts very frequently. This latter fact makes it necessary to constantly keep the steering in hand at high speed, because no matter how carefully the wheels may be pointed in the desired direction, the vehicle, shifting around on the road, will constantly change the direction. This shifting effect is lessened by getting the wheels away from the ruts; and on this account we do not permit our front wheels to track, and find the steering improved thereby. I again assert that the bicycle steering is the best one yet shown for light vehicles, and that a good steering must secure practically the same results. Further, any steering which throws much strain on the arm of the operator is to be condemned, for driving a motor vehicle should be a pleasure and not an exertion.

On the matter of clutch vs. throttle control, your remarks, while applicable to some forms of machine, do injustice to some other forms. The average two-cylinder double-acting steam engine uses a flywheel, although in motor vehicle practice it is found that the weight of the vehicle will serve this purpose, and the flywheel has been omitted. The same fact holds true with gasoline motor. We use flywheels as light as 40 to 50 lbs. with excellent success in connection with our triple motors, and such a weight can be started and stopped with a rapidity that must be seen to be appreciated. We slow down for a gutter until the motor is apparently dead, only to start it off again with great speed by opening the throttle. Of course, our combination of a light vehicle with a light but powerful motor assists this, and we believe actual usage will show the throttle system superior to the clutch control. We do all our driving using a throttle only, and secure practically steam engine results—a thing considered impossible from a gasoline engine and a revelation to most people who see it.

Chas. E. Duryea.

Reading, Pa., Aug. 26.

Needless Ferryboat Restrictions.

Editor THE AUTOMOBILE:

Owners of gasoline carriages using the East River ferries to get from New York to Northern Long Island would do well to remember there is an important choice of routes. There are three ferries by which the thickly-settled part of Brooklyn may be avoided—the 34th street and 92d street ferries of the Long Island Railroad, and the College Point ferry from 99th street. But the Long Island Railroad will not permit gasoline carriages to run on or off the ferryboats under their own power. They must be pushed on and pushed off, although the freedom from danger of such vehicles is well known.

This absurd regulation does not obtain on the College Point ferry, and the latter is really to be preferred on other grounds as well, since it avoids the crowded districts entirely and connects by good roads with Whitestone and Flushing, from which any part of the island can be reached.

It is to be hoped that the Long Island Railroad officials will before long come to a more reasonable state of mind, but meanwhile automobilists can remember that there is another route as good or better.

A. L. McMurtry.

New York, August 22.

Automobiling in the Pennsylvania Hills.

Editor THE AUTOMOBILE:

As you published in your August issue a photograph and description of my steam carriage, possibly your readers may be interested in an account of a 300-mile run made with this machine, July 29 to August 1, in the mountain districts of Central Pennsylvania.

We left our homes Monday, July 29, at 10:30, reaching the foot of the mountain pass known as Brush Valley. There we found the road impassable for autos, as the rains and lumber teams had cut it so badly that it was necessary to lift the auto out of ruts which struck the differential gears; so we reversed our engine and ran backward for 2 miles before we could turn the machine. Here we broke several glass gauges, which were easily replaced, however. We then cut across country a distance of 11 miles to another pass, known as Penn's Valley Pass, by a road just as bad as the other but less than half as long, as the former road was 16 miles, while the latter was only 7 miles. The incline was very steep, in many places reaching 45% by gradometer.

After we reached the summit we had fairly good roads for 6 miles, when we struck a low creek land which was muddy and rough for 9 miles. Here again we broke several glass gauges. These are easily replaced when you have them, but when you are in the mountains 25 miles

away from a store it is not so simple. We ran a few miles to a lumber camp and bought a glass from a saw mill engine boiler. It was ⅝ size, our gauge being only 9-16, so we reamed the gland to size of gauge with a file, cut the glass with a string saturated with gasoline and ignited, and got along well.

We made the run to the next pass without a mishap, and crossed the pass without a stop, the grade running from 25 to 40% for 4½ miles, but with fairly good roads. We occasionally ran across the road, where it was wide enough, in order to find our water line, as the incline was ordinarily too great to see water in the glass.

Just as we were getting to the finest piece of road of the entire trip we cut a front tire. We bound it with tire tape, taking 14 rolls to do the job.

When again we were ready to speed her, we let the machine fly, reaching a speed of 30 miles an hour. We ran skimming over this magnificent piece of road for 62 miles, when the tape was gone and the tire flat again. We had no more tape and were twenty-one miles from a fresh supply, so we ran the tire flat to the city of Lockhaven, where we bought a piece of steam hose 2 inches in diameter (section), drew a 1¼-inch rope through the hole, and bound it to the rim, when away we went for Williamsport and home, a distance of 56 miles, over fairly good roads, except for one mountain and 8 miles of deep sand. Our tire brought us home in good shape.

The entire distance of 299½ miles was made in 29 hours, an average speed of over 10 miles. The party consisted of my wife and self and two guests. We consumed 41 gallons of gasoline. This was the first auto ever seen in that section, and many people were perplexed as to what it was, and asked numerous questions. It certainly was a wonder to the horses, as they are not even accustomed to steam cars. If any others who wish to see the magnificent scenery of this part of the country, and to get a taste of genuine automobiling, will call at my place of business I will gladly direct them over the way.

C. E. Ritter.

Broadway and Front St., Milton, Pa.,
Aug. 8.

Sixteen Hundred Miles by Gasoline Carriage.

Editor THE AUTOMOBILE:

Having decided to make an extended tour in an auto, we could conceive of no better route than from New York to Buffalo and thence up through Canada. So on July 9th, Mr. S. B. Stevens and I left New York in a "Gasmobile" to brave the "good" roads of western New York and Canada.

The first night we spent in Albany. Eight o'clock of the next morning found us speeding up the beautiful Mohawk Valley. It was a perfectly clear day, and the roads were in fine condition, so all that was left for us was to open our throttle and the machine did the rest. Nine-fifteen found us spinning over the asphalt streets of Schenectady. At Fonda we stopped an hour for lunch, and at 3.10 we entered Little Falls, where we stopped to inquire about roads.

In five minutes time a crowd of no less than 300 people had gathered around the carriage. Upon leaving the village we ascended the far-famed "winding hill" and headed for Rome, where we spent the night.

The third day's run was to Buffalo, over all kinds of roads, good, medium and bad. Just outside of Syracuse we hailed a farmer and asked which road we should take. He told us very briefly, and then added: "Why in the —— didn't yer stay in town with that durned thing? I've got a mare colt in there I want to break in, but I darsent fetch her out on account of them things. I hope the durned thing will blow up before you git two miles." After wishing him success with his animal we resumed our journey.

The roads out of Syracuse were good for 25 miles, after which we began to ascend a succession of hills, which seemed endless.

About three o'clock we stopped at Le Roy for lunch. We reaced Batavia at six o'clock and were informed that Buffalo was only 42 miles away.

With renewed energy we again pushed forward and at 8.10 we rushed into Buffalo, having made over 175 miles that day.

While in Buffalo we made several short trips through the country. One was along the famous Erie course, west from Buffalo. No finer road can be found anywhere than this eighty-five mile run along the lake shore.

We also made a run up in Canada, where we encountered the roughest roads of the entire 1,600 miles.

After "taking in" the Pan-American we started on our journey homeward.

We had experienced no trouble until now, but it seemed that we must have some trouble to make the trip more interesting. One of our tires gave out just before we reached Syracuse, and not having time to repair it we put on a new one, which we had with us, and in forty-five minutes were again under way. We stopped in Syracuse for dinner, and as the roads were good and the weather pleasant, we decided to run to Chittenango for the night.

The next day's run from Chittenango to Poughkeepsie (over 200 miles) was the longest and hardest run of the entire trip. Two miles outside of Albany we struck a piece of road where the machine sank into mud up to the axles. The motor still drove the wheels, but we could not move until we threw in stones and rubbish upon which to get a footing. After a few minutes' delay we pulled out, and after expressing our 'thanks" to the overseer of the road, we pushed onward through Albany and Hudson, and at 8.30 reached Poughkeepsie, where we enjoyed a good night's rest.

At 10.30 the next morning we started on the final run and in a short time we were in New York once more, well tanned, more enthusiastic and greatly pleased with the trip. During the entire 1,600 miles not one cent was spent for repair, and no roads were too rough or too steep for us to travel over.

O. E. Vestal.

Jersey City, N. J., Aug. 14.

Entries for the Endurance Test.

Up to the time of going to press, seventy-six entries have been received by the contest committee in charge of the New York to Buffalo endurance run. These include forty-nine vehicles entered in the names of twenty-six manufacturers, and twenty-seven private entries.

Among the more prominent manufacturers, the Locomobile Co. of America has entered six machines in classes A and B, and one in Class E; the De Dion-Bouton Motorette Co., three in Class A; the Automobile Co. of America, three in Class B; White Sewing Machine Co., one Class A, three Class B; Overman Automobile Co., two Class B; Searchmont Motor Co., three Class B (special touring cars); American Bicycle Co., one Class B, one Class E; Electric Vehicle Co., two Class B (gasoline). No electric vehicles have been entered.

Prominent among the private entries are such names as A. R. Shattuck, President of the A. C. A., with his new Panhard; Albert C. Bostwick and Alexander Winton, with 40 HP. Winton racers; W. K. Vanderbilt, Jr., with one of his Cannstatt Daimlers; David Wolfe Bishop and Harlan W. Whipple, with Panhards; C. J. Field and Kenneth A. Skinner, with new motorettes of 15 HP.; John M. Satterfield and A. L. McMurtry, with Packards; Wm. H. Browning and Elmer Apperson, with Haynes-Apperson vehicles; Percy Owen, B. B. McGregor, H. Rogers Winthrop, and Alexander Dow, with Wintons; C. Arthur Benjamin, with a Locomobile; Wm. Morgan, Louis Clarke, and Dr. Herman B. Baruch, with Autocars; and A. R. Townsend, with a Toledo stanhope.

Three cups will be presented by Mr. Shattuck, Harlan W. Whipple, and Winthrop E. Scarritt, for the best records in Classes C, B and A, respectively, in climbing Nelson Hill.

Mr. Le Roy O. Edwards, of East Hampton, L. I., has purchased a Locomobile, and is putting it to the novel use of breaking in horses to the sight of it on the highway. Many fine horses are owned at East Hampton, and Mr. Edwards makes three dollars per hour with his machine.

A French Treatise on Electric Vehicles.

A very complete treatise on French and other European electric vehicles, with some reference to American types, has just been compiled by the well-known engineers, Gaston Sencier and A. Delasalle, and is published by Dunod, 49 Quai des Grands-Augustins, Paris. It has 400 8vo pages and 192 illustrations, and in addition to chapters describing the several types of vehicles it devotes much space to an explanation of the principles involved in electric accumulators, motors and controllers. The price is 15 francs ($3).

The Royal Motor Bicycle.

This machine was for exhibition at the New York Cycle Show last January, where it excited much interest. Its most notable feature, apart from the location of the motor, is the use of the vertical instead of horizontal cooling ribs on the motor cylinder. It is claimed by its makers that these offer greater opportunity for access of air. The transmission is from a spur pinion at the left end of the motor shaft to a gear concentric with the pedal crank shaft, and from the right end of the latter by a chain to the rear wheel. A clutch in the shaft permits the latter to remain stationary when the motor is at work.

A special two-speed gear is one of the features of the machine, by which difficult hills can be climed without pedaling. On the high gear a maximum speed of thirty miles an hour is claimed. The muffler is of an original design, consisting of a piece of tubing with closed ends and drilled with numerous small holes. A length of wire is wound around the tube, close together at the centre and spaced open at the ends, and the gases escape between the turns of wire. Gasoline is carried in the tank on top of the mud guard and the cylinder oil in the top tube of the frame. The vaporizer is said to require no adjustment. It is claimed that the machine will run 100 miles on a gallon gasoline. Its weight complete is about 80 lbs.

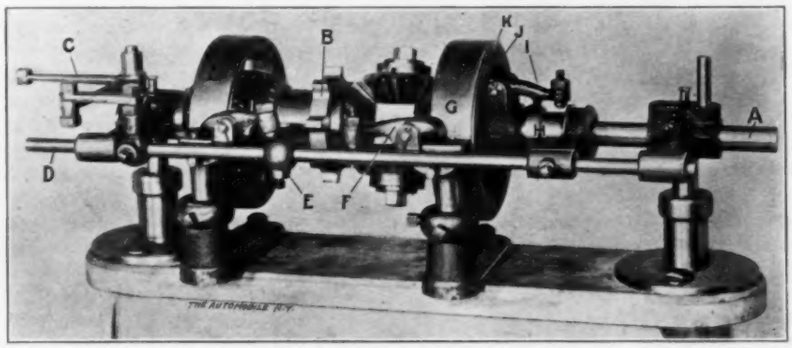
THE ROYAL MOTOR BICYCLE.

The Diebel Transmission Gear.

The accompanying illustration shows a new transmission gear which is interesting in that the operation of both forward speeds and the reverse is handled entirely by one lever.

The power is applied at shaft A by direct coupling or gear or chain transmission, and is transmitted from the sprocket B to the rear axle by a chain. The bell crank C, which may be mounted at either end of the transmission gear, actuates the sliding rod D, which acts successively on the clutch and brake bands giving the different speeds. The high speed is given by making the cam ring E act on the dog F to tighten the band G. Moving rod D a little to the left releases G, and causes the thimble H to act on the dog I to expand the clutch ring J against the shell K. This gives the slow forward speed. If rod D be still further shifted to the left it releases J and tightens the band L. This first acts as a brake to bring shaft A to rest, and then, when L is fully tightened, reverses the shaft's direction of rotation.

This gear is made in two sizes, of 4 to 5 horse-power and 5 to 8 horse-power, by the Diebel-Cox Mfg. Co., Fifth St. and Fairmount Avenue, Philadelphia.

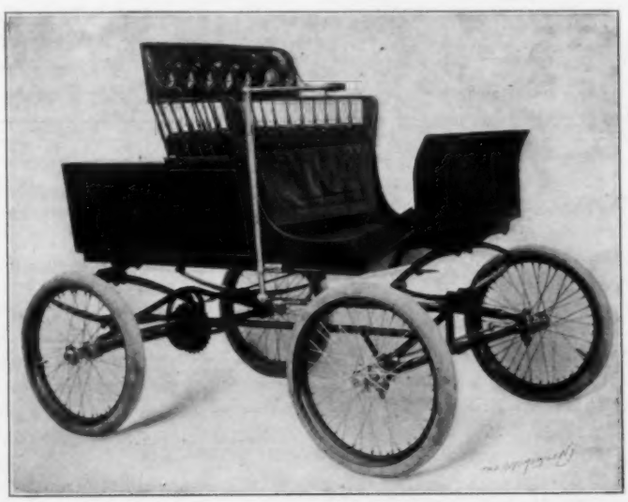


THE DIEBEL TRANSMISSION GEAR.

Eight miles an hour is the speed limit for automobiles in Buffalo.

A Steam Carriage Gear and Body.

The accompanying illustration shows a design of running gear and body put on the market by Schaeffer, Bunce & Marvin, Lockport, N. Y. It is intended particularly for the use of experimenters wishing to supply their own power equipment, and is substantially built to that end. Following are some of the specifications: Running gear of 13 and 14 gauge tubing, the axles being of triangular design, which the makers consider stronger than the arch. The only bent tubing is that around the differential, which is of 12 gauge. The back axle is carried on four sets of ball bearings, each set containing 14 ⅜-inch steel balls. The springs are 1⅜ inches wide, 36 inches long and 7½ and 8½ inches open. The wheels are made with 40 3-16-inch spokes, and rims intended for any 28-inch tire of 2½-inch or 3-inch section. The body is metallic.



A STEAM CARRIAGE, RUNNING GEAR AND BODY.

It is not in New York state alone that municipalities neglect to maintain guide posts. The Maine Division of the L. A. W., after an active campaign of agitation against delinquent local authorities, has brought suit against the city of South Portland for persistent neglect to obey the state law in that regard.

Fournier Approaching Aix.

From where we stood, the road cut down into a deep hollow, and, rising abruptly the other side, continued in a perfectly straight line, until it was lost in a bend behind the rows of trees. These trees could be followed until they almost reached the horizon, and so clear was the atmosphere that all eyes were turned in that direction, in the hope of seeing the rising dust which would announce the approach of the first car. After a long watch, which became a suspense, the dust was seen rolling along above the trees until it reached the bend at the top of the distant hill. A black spot appeared on the white road, and, after seeming to hover a second, dropped down literally like a stone. The car became distinguishable as it neared the bottom, and then it suddenly stopped dead. There was no perceptible slowing down, but it passed from what was certainly more than a hundred kiloms. an hour to a state of rest, as if it were suddenly brought up by some obstacle. That was the impression we got of it at the distance. And this wonderful control of the car was certainly the most impressionable thing in the race. The driver got down, and, after a delay of less than a minute the car moved forward on the down grade, and appeared to get instantly into top speed, sinking to the bottom, and then flying up the hill past where we stood at such a rate that the vehicle itself was indistinguishable, and the only thing that could be noticed in this momentary vision was Fournier waving his arm as if urging the spectators to clear the way. In a second he was gone, and the dust was swept up in an impenetrable cloud, which shut out everything until it rolled away across the country before the slight breeze.—The Autocar.

A Substitute for Pneumatics.

An elastic tire is the subject of a patent recently issued to Denis H. O'Meara, of Worcester, Mass. It consists of a waterproof cover enclosing a series of springs, so shaped that the elastic force is substantially the same at any point of the periphery. To protect the cover, a thin elastic tread of sheet metal is added, and the tire is claimed to be, while not a substitute for the pneumatic tire on pleasure vehicles, yet an efficient and durable substitute for the solid rubber tire on commercial wagons.

A Book on Gasoline Vehicle Construction.

Under the title "The Construction of a Gasoline Motor Vehicle" a useful book for the amateur in gasoline carriage design has been published by Emil Grossman & Bro., New York. It is essentially a reprint of a series of articles by Clarence C. Bramwell, published in the "Motor Vehicle Review" last year, and it deals with first principles and then takes up in detail the construction of a light carriage. It is fully illustrated from the author's own working drawings, with all dimensions and full instructions as to machining and fitting. Its price is $2.00.

Pushing Wood Wheels.

A representative of THE AUTOMOBILE recently visited the wheel works of Phineas Jones & Co., Newark, N. J., and was shown through the factory. This firm is one of the pioneer manufacturers of wood carriage wheels and was also one of the first to see the future possibilities of the automobile and make a specialty of wheels for this service.

During the trip through the factory our representative saw automobile wheels in all stages of manufacture. Special care has to be used first in the selection of the wood, and then skill in manufacture is the next thing.

The firm has at present many orders on its books from the leading automobile manufacturers. On the occasion of the visit referred to, among the automobile makers for which wood wheels were then being made, may be mentioned:

10 sets for the Pierce Motor Vehicle Co., Bound Brook, N. J.

5 sets for the Autocar Co., Ardmore, Pa.

3 sets for the Searchmont Motor Co., Philadelphia.

6 sets per week to the Automobile Co. of America, Marion, N. J.

The firm is unusually busy at present.

Two New Lunkenheimer Specialties.

A new sight-feed lubricator with glass body, designed especially for gas engines, is shown in section in the cut, Fig. 1. Its especial feature is the cover for the filling hole, which, instead of taking the form of a screw plug, is a sort of flat nut which screws on the central boss of the cover K. An extension on one side A of this nut carries a fixed plug F and a screw B, whose point bear on a small disk forming the cover proper of the filling hole. A fraction of a turn of A uncovers the hole; and the wear in the cover disk is taken up by the screw B. The rate of feed is adjusted by the nut D, and the feed is started or turned off, without disturbing its rate, by raising or lowering the cam C.

For steam carriages the water glass shown in Fig. 2 is distinguished by a stiffening plate, the whole being fastened to the side of the vehicle by lock nuts on a long-threaded shank which goes through the vehicle body. The connecting unions are threaded for ⅛-in. pipe thread.

The Lunkenheimer Co., Cincinnati, is the maker of these two specialties.

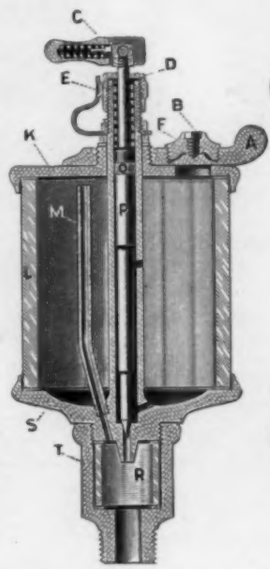


FIG. 1.

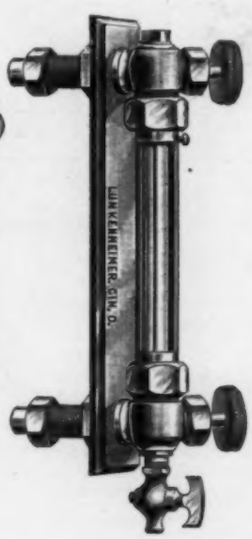
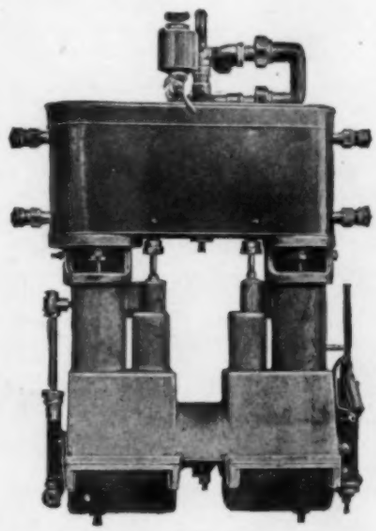


FIG. 2.

The Stearns Carriage Steam Engine.

The accompanying cut shows the engine used by the Stearns Steam Carriage Co., of Syracuse, N. Y., in the carriage recently illustrated in these pages. It is compound, with high-pressure cylinder 2 by 3 inches and low-pressure cylinder 3 by 3½ inches, and it normally develops 2¾ HP. By means of a distributing valve, steam at boiler pressure may be admitted to the low-pressure cylinder, to overcome hills and very bad roads. As the cut shows, the engine is wholly encased and is self-oiling. The water and air pumps are attached outside, and are driven from the cross-heads.


THE STEARNS CARRIAGE STEAM ENGINE.

A Valve for Auto Tires.

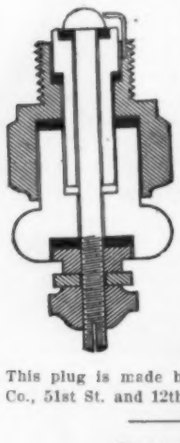
The Bown Tire Valve Co. has just been organized to manufacture and sell tire valves under the Bown patents. It has just produced a valve for automobile tires, of which a sectional cut is shown herewith.

The essential feature of the Bown valves is the use of a small rubber ball instead of the metal plunger heretofore customary. This greatly simplifies the construction of the valve and leaves practically nothing to get out of order. When the tire is inflated the cap is screwed down till the washer under it makes a tight joint, when the very slight leakage around the ball presently releases it from its

seat, and it rolls freely in the barrel till the cap is unscrewed, when the outward rush of air again seats it. The company is located at 92 South Jefferson St., Battle Creek, Mich.

The Desberon Spark Plug.

A new spark plug for gasoline motors, designed to minimize the chances of short-circuiting by compelling the spark to traverse a long path before this can occur, and also to protect the porcelain from breakage, is shown in section in the accompanying cut. It has two porcelains, one of which partially telescopes within the other, but without bottoming in it; and the two are held in place by a stiff steel bolt and nuts, with asbestos washers at all points of pressure. No cement is used with this plug, a copper washer fitting under the shoulder instead, when the plug is screwed up. This plug is made by the Desberon Motor Car Co., 51st St. and 12th Ave., New York.



Business News.

The Duryea Power Co., Reading, Pa., sends a new pamphlet describing the well-known Duryea vehicles.

The Electric Vehicle Co. has published a vest pocket map of Buffalo and the Pan-American grounds.

The Century Motor Vehicle Co. has issued an attractive pamphlet describing the Century steam carriage.

The Automatic Equipment Co., 21 Quincy St., Chicago, is a new concern established to handle automobile supplies.

The Standard Roller Bearing Co., Philadelphia, Pa., has purchased the axle business of the Ball Bearing Co., Boston.

The Grout Bros. Automobile Co., Orange, Mass., sends out a new catalogue describing the "New Home" steam carriages.

A little book of testimonials to the merits of the "Auto-Bi" comes from the E. R. Thomas Motor Co., Buffalo, N. Y.

The Marsh motor bicycle is described in a neat pamphlet from the Motor Cycle Mfg. Co., 705 Centre St., Brockton, Mass.

The Diamond Rubber Co., Akron, O., is sending out a catalogue of Diamond single-tube tires. It is neatly gotten up and printed in three colors.

The Remington Automobile and Motor Co., Utica, N. Y., has issued a pamphlet describing the gasoline vehicles and launches built by them.

The right to manufacture and sell the Hall Sectional Rubber Tire has been acquired by the Consolidated Rubber Tire Co., 40 Wall St., New York.

The Diebel-Cox Mfg. Co., 5th St. and Fairmount Ave., Philadelphia, issues a circular showing the automobile running gears and parts made by them.

The Stearns Steam Carriage Co., Syracuse, N. Y., is sending out a tastefully gotten up pamphlet setting forth the merits of the new Stearns steam carriage.

A. L. Dyke, St. Louis, Mo., is making his float feed vaporizer in aluminoid as well as brass, and the former is considered especially suitable for light vehicles.

A pamphlet describing the "Knickerbocker" gasoline carriage, lately illustrated in these pages, comes from the Ward Leonard Electric Co., Bronxville, N. Y.

A leaflet containing testimonials to the value of Dixon's flake graphite, from users of steam and gasoline automobiles, comes from the Joseph Dixon Crucible Co., Jersey City, N. J.

A new catalogue for 1901 has come from the Gould Storage Battery Co., Depew, N. Y., describing and illustrating the many styles of the Gould storage battery for stationary and automobile service.

The Standard Wheel Co., Terre Haute, Ind., issues a new price-list, giving illustrations, dimensions and prices of its large line of axles, skeins, hubs and wheels for horse vehicles and automobiles.

The Wisconsin Wheel Works, Racine Junction, Wis., sends a pamphlet describing and illustrating the "Mitchell" motor bicycle. This bicycle is equipped with an air-cooled motor of the company's own manufacture, and rated at 1¾ B.H.P.

The Remington Automobile & Motor Co., Utica, N. Y., has lately put one of its 4-HP. twin cylinder gasoline motors into a 20-ft. launch hull, built by Samuel Ayers, of Upper Nyack. The boat is of 5-ft. beam and is said to do better than eight miles per hour.

Mr. T. E. Griffin, for the past two years assistant superintendent of the Locomobile Co. of America, resigned last month, to accept the position of sales manager with the Stearns Steam Carriage Co., Syracuse, N. Y. With Henry L. Crebert, the general superintendent, he will drive one of the Stearns carriages in the endurance run.

Patents.

List of Automobile patents granted during month of August.

679,387—Carbureting apparatus for explosion motors. Issued to J. C. E. Mathieu.
679,555—Motocycle. Issued to H. Dufaux.
679,471—Motor vehicle construction. Issued to J. F. Byers.
679,366—Motor vehicle. Issued to R. R. Darling.
679,669—Vehicle short turning gear. Issued to F. Franz.
680,103—Starting device for oil or gasoline engines for automobiles. Issued to J. P. & J. N. Wright.
680,074—Motor vehicle. Issued to L. W. Pullen.
679,773—Spring motor vehicle. Issued to J. L. McDowell.
680,618—Electric automobile motor. Issued to Richter & Eschler.
680,668—Automobile vehicle. Issued to A. E. Osborn.
680,535—Apparatus for charging storage batteries of automobile vehicles. Issued to J. B. Meriam.
680,237—Motor for automobiles driven by explosion of inflammable vapors. Issued to M. A. Audelin.
680,572—Sparking igniter for gas engines. Issued to Termaat & Monahan.
680,392—Means for securing resilient tires to vehicle wheels. Issued to H. A. Palmer.
680,602—Motor vehicle. Issued to C. A. Lieb.
680,891—Automobile. Issued to W. C. Smith.
680,899—Automobile. Issued to A. Thompson.
680,941—Carbureter. Issued to A. C. Sargent.
680,961—Carbureter for explosive engines. Issued to H. H. Buffum.
681,062—Horseless carriage running gear. Issued to G. J. Loomis.
680,804—Electrically propelled vehicle. Issued to Newman & Ledwinka.
681,025—Safety device for automotor vehicles. Issued to V. Huberti.
680,764—Steering gear for motor vehicles. Issued to H. R. M. Cormery.